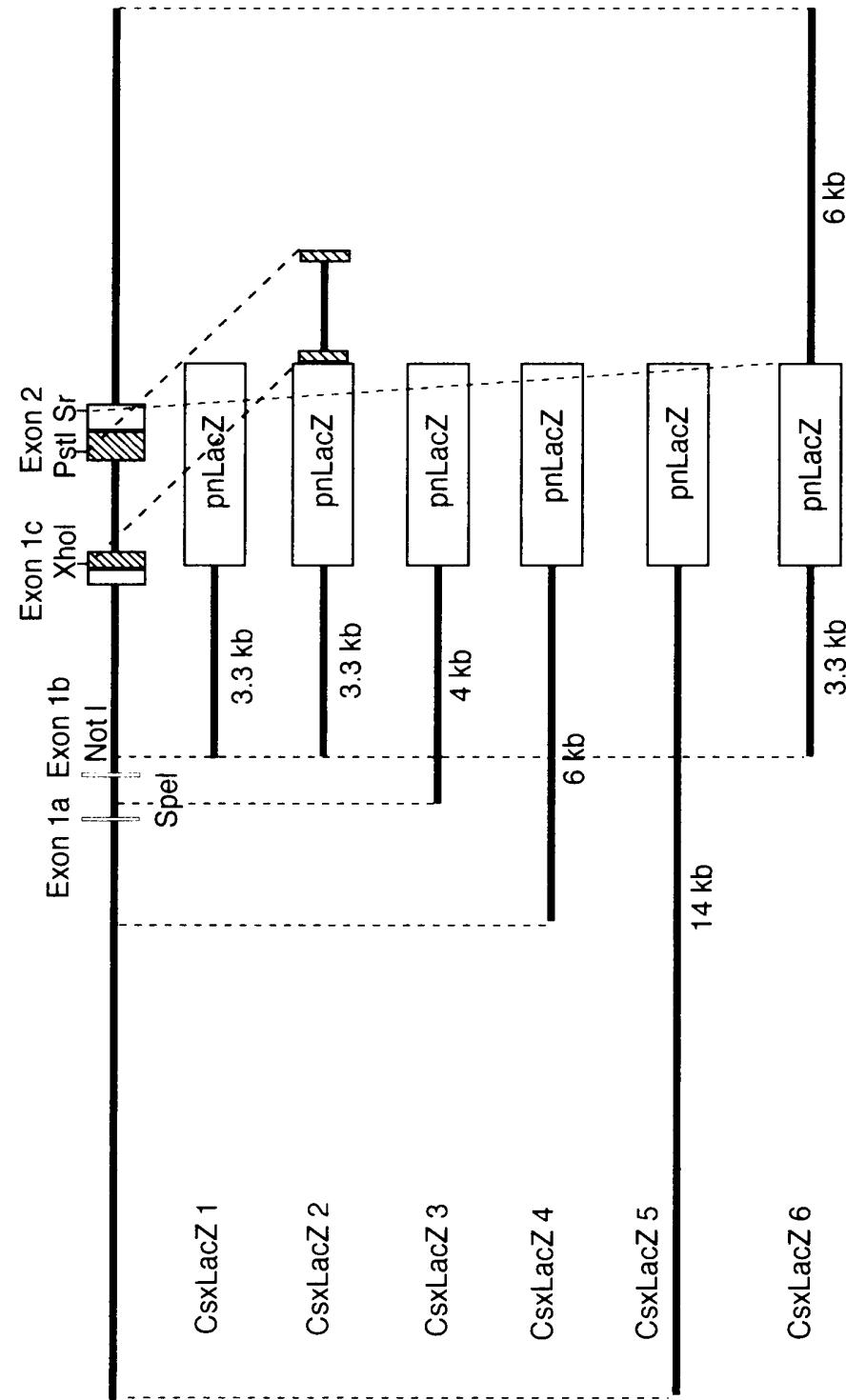


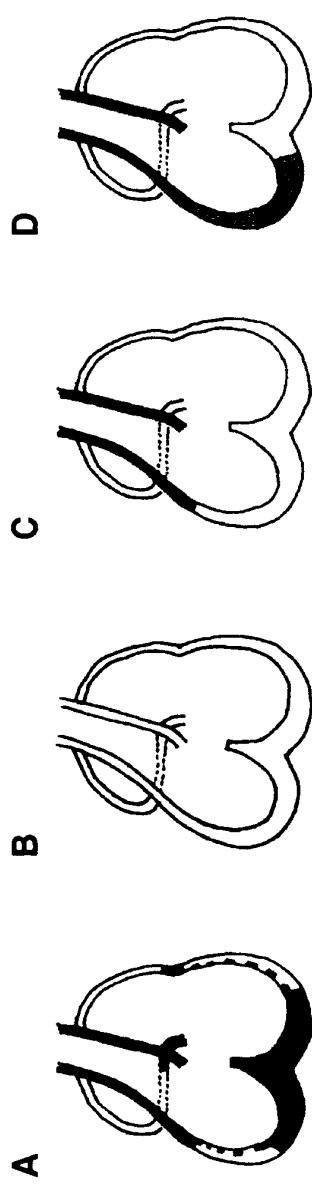
FIG. 1

**The Genomic Structure of the Mouse *Csx/Nkx2-5***



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## The Locations of the *Csx/Nkx2-5* Cardiac Enhancers



Endogenous  
*Csx/Nkx2.5* at E10.5

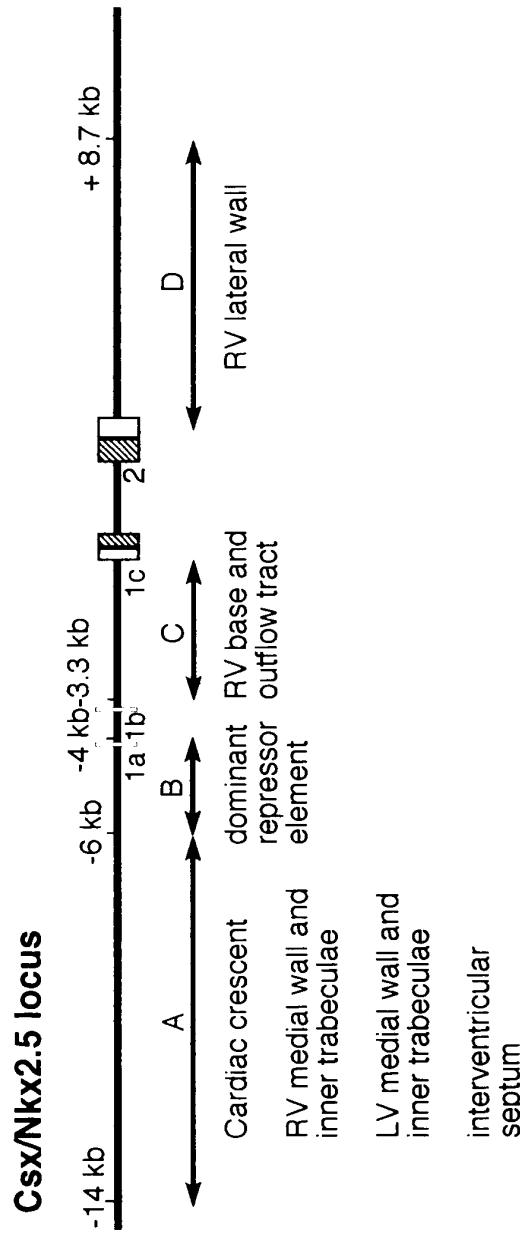
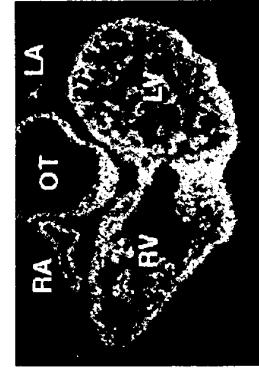
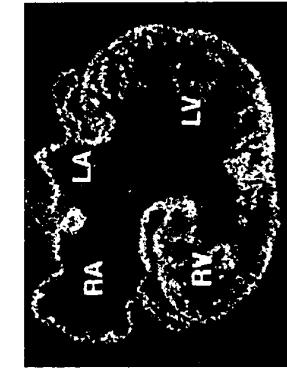


FIG. 3A

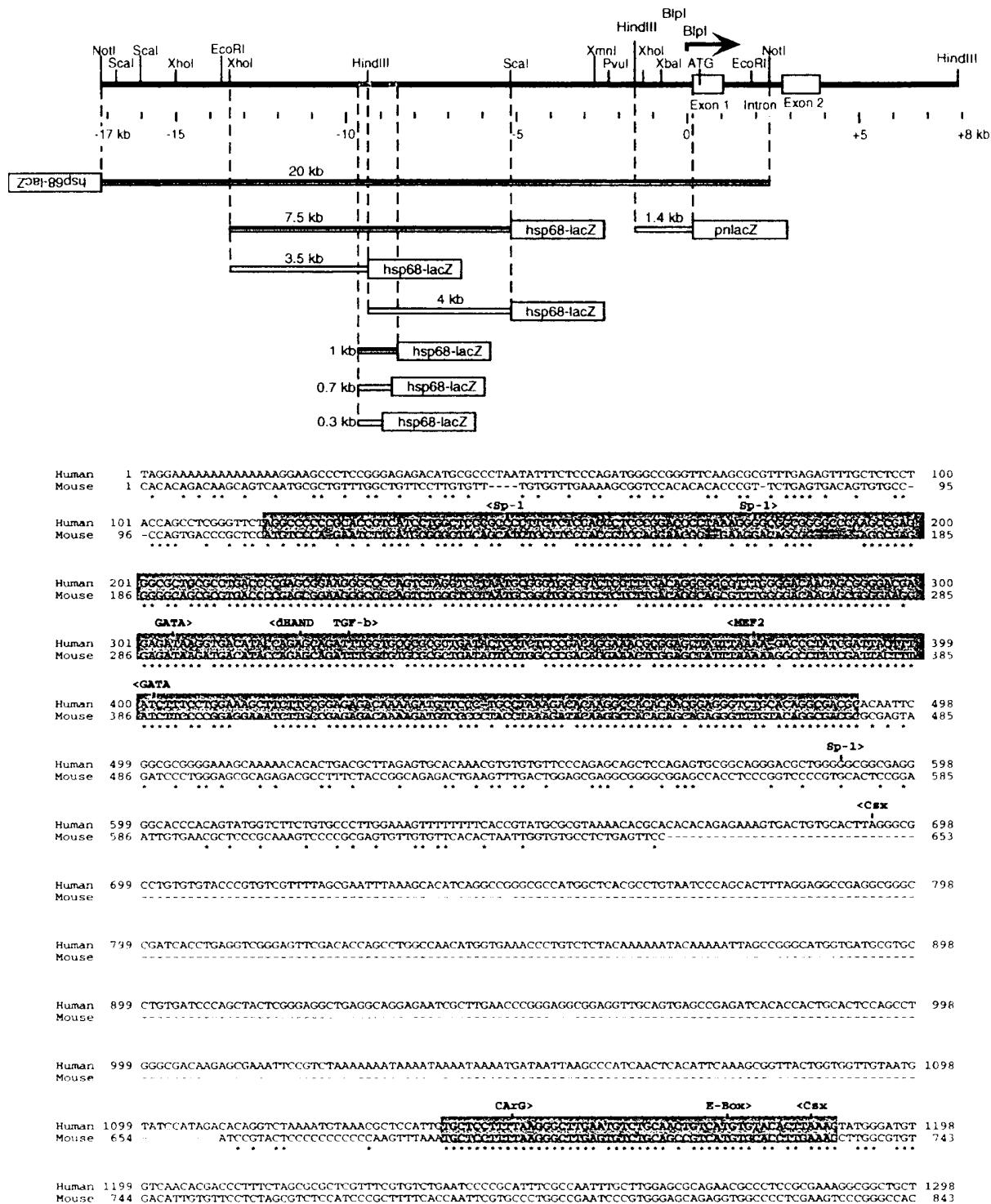


FIG. 3B

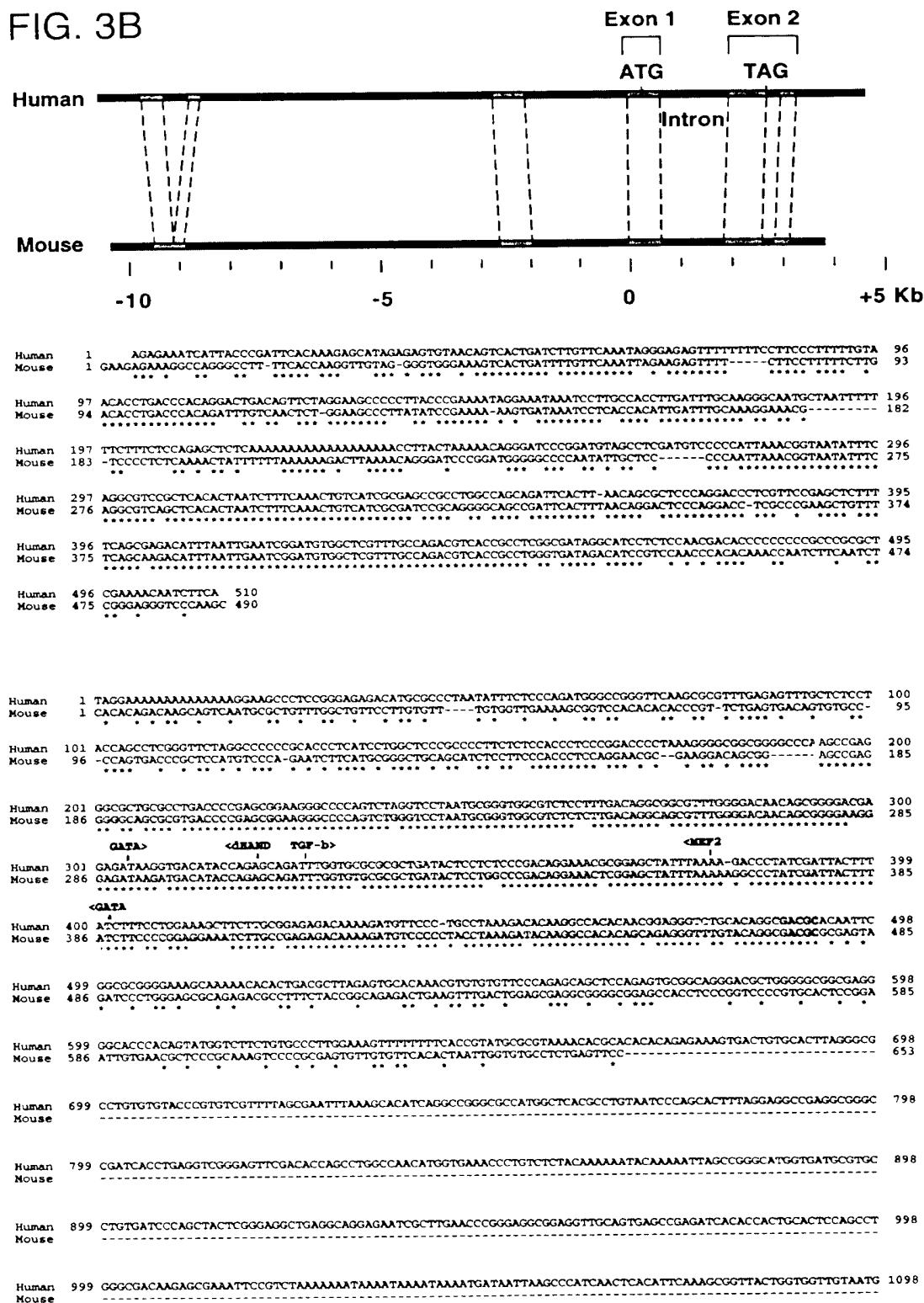


FIG. 3C

**The Genomic DNA Sequence Homology  
Between Human and Mouse *Csx/Nkx2-5***

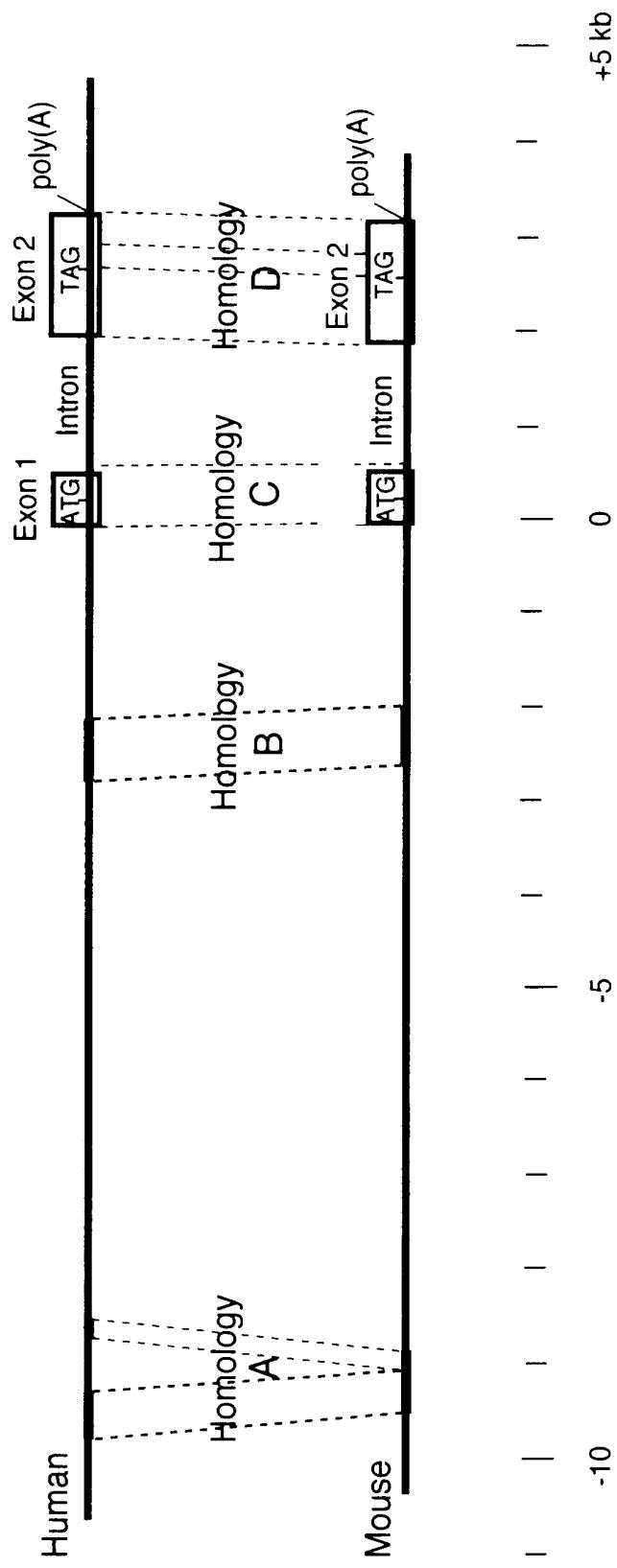


FIG. 4A (1)

CTCGAGCCCAGGAGTTCAAGACCAGCCTGGAAACATAGGGAGACCCC  
TCTCTCTCCACAAAAAATTAAAAACTAGCCAGGTGTGGTGGCAAACA  
CCTGTAGTCCCAGCTACTCAGAAGGCTGAGGTGGGAGGATCACTTGAG  
CCTGGAAAGTAGAGGCTACAGTGAGCCGTGATCACACCACTGCACTCC  
AGCCTGGGAGACAGAGTGAGACCCCTGTCAAATAAAATAACAAACAAAT  
AATGATTAAAATAACTAAAACATAAATTTATGCTATTTCACCTGTAT  
TTTGTAAAGATTTAAAATGAAAATTCCCAAATTGCTTTCCAGAAGG  
ATTGTTCAAAATTATACCCACATTCACTCATGTTCTTCTGAACA  
GCAGCAATCAGGAAAACCTCCCTGGAAGAGGGCAGGGCTAGACTGAGA  
TTTAAAAGGGGTAGGCCTCAGCTCTCCAGGTTACACTGTGC  
ATGTTCCAAACTCAAAGAATTACACTCTTCTGTTGCATTGCTCTG  
TAAAGATCTGACCCACTACTATGTATTAAAAGGGATGCATGATAATG  
AATTCAGCCCTCTGTAAAATCCAAAGGGCCTATTGAGTTTCCCC  
CATTTAATGGTCATTAATATTCTGGGAAGGACAAAGCTTAGTT  
AACTATGAGAAAACAAGCAGAACCGCCCTGGATTCTGCTTCAAAG  
ATTTTACCATGTTGGCAGGCCTGGTAGTCCAGAGCCAAGAAAATATC  
CCAGCCACAGATACCCCTAGATGTAGACTAGCAGTGTACAACCTCAAG  
GTCAGAAGTATGTCACTAGACCAGAGCCAAAATAGGTGCTATATCAT  
TAAGAGAGTAAAATGCAAACACAGACAGGGTGACATTATTACAAT  
AAGCATATAACCCACAGGGACTCCTATCTGAATATGCAAAGAACTCT  
CACTAATCAATAAGAAAAGGCAAAGATTAAACAGGCACCTCACAA  
AAAAGTATATTCAAAAAATCAATAAACATTGAAAAGATCCTCAATT  
CACTAGTTATTAGGGAAAGGTGAAATAAAACCACAATGAGACACCCCC  
ACGCCCCACCAGAACGGCTAAATCTAAACATGTAATACCGAATG  
TTGCAAGGATGCGGAGAAACTGCCATTGTACACTGCCAGTATGA  
GGTAAATCTGTACAACCAGGTTGGAAACGCTGAGTAGAATGTACTC  
TAGCTGGATTGTGAATATCATATGATCCAGCAATTCTACTCCTAGAA  
ATTTACCCAAACAGAAATGTGAAACATGTTCACCAAAAGACACACGCA  
AGACAATTATAGAGGCACTCACATTCTAACAGTCAAAGACTGGAA  
ACTACCCAAATGTCCATCAGCAGAGAATGGCGATAAACAGTAGCATCT  
TCACATAATGAAATGTTGACAGCAATGAAAAGTAGCTAGCTACAAC  
TACAAACAATGTGATTGAACCTCACAAACATATACTAAGTAAAATTAT  
CAGACACAAAGAGTGTATATACTGTATTAGATACATGTGAAGTCTGA  
AAACAGGCAAACACTATTCTGTTGTTAGAAGTCAGAAATAGTTACTGCC  
TGCCGGAAACAGAACTCAAGAGGGCTTAGTAGCTACTGGTAATGTTCA  
TGCTTCTGAACCTGCATGCTAGTGAGGCAGCTGTTATTGTGCAGTC  
CTGTTGTTACACTGGAGTTAAAGTTCCCCAAAATCAGAAAGTGTCA  
GCAAGTGGAAAGCAAGTACACTGCTGGACTTGGCTGGAACTAGGGGA  
TCCCATAATTGTCACAGGCACAAGCAAAGCCAGTTCTGCCNTAA  
GTAGCATCTCCAGAGTCAGGATCCAGGAATGGTTGGCAGGCAGGAT  
GCAAGGCAGGATTGGGAGTGGCTGAGAGTTTCCAGTGCCACCTGG  
TCCCACCTCCCCCTCTCCACTTCTAATGAACGGCAGTACAGCTTCTG  
TTAGGAAAAGAGCCTGGGCTCCAGGCGATGACTGTCACTAGGGA  
GAGGGCGATGCACTGGGTCCACCTACACCCCCCTGGCTGTCTCA  
CCACTCTGAATTATAATGCCGGACTTCTCATCTCCCACCCACACA

## FIG. 4A (2)

TCTTGTAGAAGAAAAGAACGAATCTCCAGGGCTCTTAACAAA  
AGTGGTCAATTAGAGTAGCCCTGCTTGAGGGCCCTGGCTGGAGGAG  
TGGGAGAGGCAGCCCTCCCCCTCCAGGGAGGTATCTCCAGGGCTACC  
CAGGACTGAGTAACCTAGGTACCCAGAGTAACCAAGAGGCAGGAGACA  
AGGGCATTCAAGCATTGGCCAGGAATGGAGGGTGTGATGTCCAGTTCAT  
GTTCTCTGGTTCCAGCATAGCACACGGTCAAATGAACCACATCATGCA  
AGAAAACACAGCTAGTCTCCCTCCTCCACCAGCAACCTTGGTTACT  
GATAATAATCAAATTCACTATTTTTTTTAACTAAGGCTGAG  
ATAATGTCAAAGGACCACAGGGATAGGAAGGCCTAACCAAGGCCTT  
AAAGAATGAGAAGAAGATTCAAAAGCCTCTAAGGGAGGAAG  
ATGTTTTCCCTCCTTACTTTCTACAGTAATTTTATTGGATAA  
ATAAACCTGATAAATGAGAACCCACGCTTCCCAAGGCCAGGCTGTG  
TTTGGTGGTGGTCCTCCGTCAAGCAGTGGAGTAATCCAGAGTGATC  
CCGGGCAAGTCGGAAGGGAGCAAGTCTGTGTTGAAGCCAAGAGGTATC  
TTCCCTACAGCTCTCAAGAGAGGGATCCCCGTGGTAATTGTGAG  
GCTGGAAACACCGAGAGGGCTGACTCCCAGTTATAGAGGTATTGAT  
GGGTTTGTGCATGGAAGGCAGGAGGAGACTGAGAGTGCTTGTATTG  
TTATTGGTTATTAACTGGATCAGCCGACTTGA  
ATACAGAAAATGAAAATGAGGAGATTGCATAACAGCGCTTGGACGT  
CTGAAGGGGCCAGGGCTAGCGGCTGGGGCACCTAGAAACACTT  
CTGCCTGCAGATCGCGAGGGTTAGCCACAGGAAGGGTGCCTAGGC  
TGGCCACAGGGCTTGCTGTGACTGAAGGACCAGCCTGGCGGCACC  
TTCTTCCCCTGCCTGCACTCCGGCCCCGCCGGAGTCAGAGCTGA  
CTTGCTGCAGGTTGGGAGAGGACAGAGGCTAGGACGGTGGCGAAACC  
TCACCTCGTCGCAGTCCGGAAAGGTAAACTGGACCCGGCAGGACTTC  
CTAAAGTCCAAGCTGCCCTCTGAAGAATAACCTGATTTCCTCCG  
GACGCGGACAAAGGAGGATTGCTCACAACTAGCCTGTAACAAAGATT  
CCCTATTTCGTGGTTAGGAAAAAGGAAGCCCTCCGGGA  
GAGACATGCGCCCTAATATTCTCCCAGATGGGCCGGTTCAAGCGCG  
TTGAGAGTTGCTCTCCTACCAGCCTGGGTTCTAGGCCCGGCAC  
CCTCATCCTGGCTCCGCCCTTCTCTCCACCCCTCCGGACCCCTAAA  
GGGGCGGGGGGCCAAGCCGAGGGCGCTGCGCTGACCCCGAGCGGA  
AGGGCCCCAGTCTAGGTCTTAATGCGGGTGGCGTCTCCTTGACAGGC  
GGCGTTGGGACAACAGCGGGACGAGAGATAAGGTGACATACCAAGA  
GCAGATTGGTGCAGCGCTGATACTCCTCTCCGACAGGAAACGCGG  
AGCTATTAAAAGACCTATCGATTACTTATCTTCCTGGAAAGCTT  
CTTGCGGAGAGACAAAAGATGTTCCCTGCTAAAGACACAAGGCCACA  
CAACGGAGGTCTGCACAGGCAGCACAATTGGCGCGGGAAAGCA  
AAAACACACTGACGCTTAGAGTCACAAACGTGTGTTCCAGAGCA  
GCTCCAGAGTGCAGGGACGCTGGGGCGGCAGGGCACCCACAG  
TATGGTCTCTGTGCCCTGGAAAGTTTTTACCGTATGCGCGTA  
AAACACGCACACACAGAGAAAGTGAATGTGCACTTAGGGCGCCTGTG  
GTACCCGTGTTAGCGAATTAAAGCACATCAGGCCGGCGCCA  
TGGCTCACGCCTGTAATCCCAGCACTTTAGGAGGCCAGGCAGGGCG  
TCACCTGAGGTGGAGTTGACACCAGCCTGGCCAACATGGTAAAC

### FIG. 4A (3)

CCTGTCTCTACAAAAAATACAAAATTAGCCGGGCATGGTGATGCGTG  
CCTGTGATCCCAGCTACTCGGGAGGCTGAGGCAGGAGAATCGCTTGAA  
CCCGGGAGGCAGGTTGCAGTGAGCCGAGATCACACCACTGCACTCC  
AGCCTGGGCAGACAAGAGCGAAATTCCGTCTAAAAAATAAAATAAAAT  
AAAATGATAATTAAAGCCCATCAACTCACATTCAAAGCGGTTACTGGTG  
GTTGTAATGTATCCATAGACACAGGTCTAAATGTAACGCTCCATTG  
TGCTCCTTTAAGGGCTTGAATGTCTGCAACTGTCTATGTGTACACTTA  
AAGTATGGGATGTGTCAACACGACCCCTCTAGCGCGCTCGTTCGTG  
TCTGAATCCCCGATTCGCCAATTGCTTGGAGCGCAGAACGCCCTC  
CGCGAAAGGCGGCTGCTGATCCCGACTTGCTCCGTATCGCGCAGCT  
TGTGGCCTCCGGTCCCCGTGCCATGCCCGGGAGGCTCTCCACA  
GACACCGCTTGCAGCGAATTATAAGAGACTGAATGGGTTTTGGTG  
TGTGTGTGCAACACAACATTGTCAGCTGCTGTCACAATGCGCTCC  
GCCGGCGGTGGAAACTTGGCTGCGTAACGCACAGCAGGTTGGAGGG  
CACGACCCGGAAGGAAGGAAGGAGGGCAGGAGGGAAAGGCGGCACCC  
AGGCCCCGCTGGCCAGCCGTTCCAGCATCAATTCAAGCACTGAGCCGGC  
CGCAGCAGCACAGGGCTGGGCTCCCGAAGTTCGGCCAGCCGGGT  
TTGGGCCAGAGCCGCGAGGCTGCCGGTGGTAGGTGCGACTCTCAC  
CTCTCCGGGAGCGCGCCGACGACCCACCCACCCGAAGCGCTGC  
CGTCGGCCCGGCTGGTCCCCCGCGCGGGCACAAAACAGGCGGCAGTT  
CGCCAGCTCTCTTCCAAACCTGAACCGCCAAGCGAAGGTTCTC  
CAAAGTCGCGGTTCCCCGGCTTCACACCCGCCGGCAGGCGGAACC  
AGCCCAAGGACAACCATTTCTCTTCACTGTATCTGAGTCGTTGTCC  
ATCTGACTCGAATGTCACCTGATTTCCAGCTGTGACCTCCAGCGAC  
GGGACTCCGAGGAACCTGATTCCAGCGTCTCGATTCTCTCCGCTCTCC  
GCCCGTTTGGCTGAAGGGTTTGCAGCCGTGGGAGAAGGGGTGG  
GATGTGGCAGCCACCAGCCCCAGCCCAGAGAAGAAAAGAGGACGAAAT  
TAACCGAAAGGACACCGGAAGTCTGAAAGCGACTCCCTGGATCCTC  
GGAATCCGAGGCAAACCTAACACTAGTTGAAAGCGGATCATATCA  
CTAATCCAGGACAATTGGGTTGGAAACATACTCCCCAGAGCCTAA  
GAAAATGACTTACAACAAAACAAAATGACAAGGACAAAATGCAAAG  
GAGTTGTGAAACGTAATTGCTCTCAGAAAATATGTGTATATATAC  
ATCCTATAATATGTTTAAATTGCAAAAAAAAGTCTCTAAGAGGAT  
ATATTGTTAAACCACTGGCAGCTGGGAGGGAGTGGGATTAGCTGA  
GAAGGGAGAAGGAAGCATTGGAGGTGACGTAATGTTGTATC  
TTGATTATGGTGGCTGTTATGGGGTGACATCCAAGTGTCAAGACTC  
ATCGAAGTACACTTTGTTCTAGGTACATTAGACCTCAATAAGTG  
GATTTAAACCTAAATAAGCCAGGTAAACAGCTTGCCTGGTGGCTGG  
GGGAGAGGCTGGGACACTTACATTGATCTCCCTCTAGGCATGTT  
GTTTGGTTGGTTGTTGTTATGATGTATTATTATTCAAAAATAT  
ATCATTAGCAGAGTGAATGATGAAATGTAACCAAGGAA  
CCAACAAAAGCGGAACAAAGAGACACTGGTGCATCCTGTTAGAGGGAT  
AAGAATAAGCACTCGCTGTCCAAGCTCATAAAATATTGGGAATGAA  
TGTGTTCCGCTTGGTTGGTTGGCTCATGTGTTAACAT  
CAACGAGAAATGAGGACCCAAAACCTATCCAGTGGTACGTGTTG

**FIG. 4A (4)**

GTGTGGCTGTCACTCCTTGGGACTGGCTACTGAAGGCCACAGGCGTG  
GGAGGACCAAAATGCTCCCTGGATGTTGAGTCCCAGCCGGTAAGCAGCA  
CACAGTCCCCGCTTGCAGCAAAGATGTGGTGGCCGGCTGCGCTGTGGGG  
GAAGGCCAGGCCGGACAGGAACCTCAGATCTCACCGGCCGATGAGAG  
TGGTCCCCCTGCAGCTGGAGTCCCTGCTGGCCTGAGAGCTCCAGCTG  
TGCCACCGTTGGGCAGACCCCCACACTCAGGGAGCTGCCAGGATCAGT  
GGCTACAAGAGTCCCCACCGTGTGGAGAAAATAGGTATGAAATATT  
TCCATTACACCCCTACCCCGGCCAGACAGGAAGTCACTTCAACC  
TTGTTAGGTCAAGATTCCAGATCTGGTCAGATGCAGGGCTATTCAGA  
GAGATTTTAGAGGCTGACTCTCAGGAGAGGGAAAGGACAGTGGGCTGA  
AGGCCAGGGTCAGGAAATCTAGGAACGTGCTAAACTCCTCTGCTGGCC  
TGCAGGGAGCGCCGGGTGGGCTACCAAGGCCACAAGCCAGTTCCAT  
CTTCCCACTTGCCACCTCTCACAGGGACCAGGGCTCTGCATCCTCAG  
TGACCACAAGACTGGGCTGCCCTCTAGTTGTCTATACCTGCC  
TCCCTGACTCATACTGTCAGACCCCCAAGACAAACCAAGTCAG  
GAGAGATCTTGAGGGCAGCCAGTGCCACCAGGGCTCTGTTCCAGGT  
CTACTAGACAAAGGCCACCCCTCTCCCTCTCTAGGGCTCCGCTG  
ACCACCCCTGCACAGTCTCCTACACCAAGGGCTCCGGTGC  
CACAGAGAGTTCACTGCACCGCTGCTCGCTGCCTGTCTCAAACCAT  
ACACACACCTTGATTCTAAACTCCAAGATTAGGATGGGCCAGAA  
ATCTGCATTTAATATGTACCTCAGAGGATTCTGGCCTAGATATTC  
TACAGCCCCAAAAGTAACAAGGAACCTGTTCCAAAAGTGTATTACGG  
AAACTGTCACTGTTATTCTTGACTTGCCCCCAATTATTCTCC  
AAGTTTCATCACCAAAAAACCCACATGTGAACCATATGTGTACATA  
TGCCCATATTTAAACAAATTCTGCACCTGGTTGCTATTTAAAGT  
ATCTCAAAACATATCCATAAGAATACATATGAATGGAACATAATTCTT  
CTCATGGGATATGGGATCTGTTCTATGGACAACATAATTAAACAG  
TCCTAGTATATACACTGGTTTACATGTTGATCTTAAAAATAA  
AACGGNTGAAA (SEQ ID NO.: 4)

## FIG. 4B (1)

CAATTCTATTNAGTTATTAAAAGGGATTTTTNAACTCACTGGNAACCAGGAGGA  
CTGNAAAAGAAAGTGAATGGCTCTGGACTTCTCTAAGGAGACCAGCATGGTCGCC  
CCAATTTATTTGACGTATTGTCGGTTTGCCTCTCCTCTGAAACAC  
CAAGACCTTTGGAAGCCAAGAGAAATCATTACCCGATTACAAAGAGCATAGAGAGTG  
TAACAGTCAGTCACTTGTCAAATAGGGAGAGTTTTCTCCCTTTGTAACAC  
CTGACCCACAGGACTGACAGTCTAGGAAGCCCCCTACCGAAAATAGGAATAATCC  
TTGCCACCTGATTGCAAGGGCAATGCTAATTTTCTTCTCCAGAGCTCTCAAAAA  
AAAAAAAAAAACCTTACTAAAAACAGGGATCCGGATGTAGCCTCGATGTCCCCAT  
TAAACGGTAATATTCAGGCGTCCGCTCACACTAATCTTCAAACGTCACTCGAGCCG  
CCTGGCCAGCAGATTCACTTAAACAGCGCTCCAGGACCCCTGTTCCGAGCTTTCAAGC  
GAGACATTAAATTGAATCGGATGTGGCTCGTTGCCAGACGTCAACGCCCTCGCGATAGG  
CATCCTCTCCAACGACACCCCCCCCCGCCGCGCTGAAAACAATCTTCAAAGGCAAGG  
GGGCCCCCAAGTAGGTTAATTAACACATAACGGTAACGTGGCCAAAAGNCAGGCGAG  
GAAGGGCCGCAAGGCCGTGACATGCAAGCTCCGTCAGAAGAAAGAATTGGGTTGGAGGTG  
AAGAGGTGGGGGACGAGGTTCTGGCCTTGACAGCCCCACATTAAAAAGGCATCC  
TCCACAGACTAGACTAACAAATTCCAGACCCCCAGTAGTCCCTGGCTCAGAAACTCGAGGC  
GTGATTTCGGCGTGGCAGCCCAGGCCTGTTACTGACGGCTGGCGCCTAGAACGCCGGGTC  
AGGGCGTTGCGCGCCTCTGGCTGCCCTGCGGGCTCACCTCTCCCCAGCATGGAGG  
CCCCAGGTCTGGAGTGTGGCTTGATGAGGGACAGGAAAAGTCCAACATCAGGCCAA  
TGCTTGACTTCACTTGCCTGGCGTCTCAGACGGCACACTGTCGGTTTGAGCACCCAAG  
ATGTACGTTCTGGACAGACACTATTTGTCACATACATGGAGCGTTCTCCGCACCTT  
GGCGCGCCTGCGGGAGCTGTGTTAGGTAGTTTGCCCTGCGCCGCCCTTATTCT  
ACTCCAAGCGCTTTGCCAAACCCGCACTCCGCAAAGAGCCAAGCCCTCCACATCCCCA  
TTCTCAGCAAGTCCACGCGTCCGCCAGCTCCGCCCGGGTCCCTGTACCGCTAG  
GGCGTGAGAACCAACGCTTCACTGACAAATCTGTATCCCCAGCTCTAGAACGC  
GTCCTTAACCTGGCCCGCTTGCTGCCGGACTCCTGAATTGTAAGCAAATAAAACT  
CCTCTGCAGTGTCTGGGAATGGAGAACCCCAAGCTTCATCAGACCCCTCCCAAG  
GAGTGCAGGGACCCAGAGAAATGAGGCCACCCGGCAGGATCTGGCCATGTAGCTGGCGC  
TCCTGAAACTCTGGCAGATTGCTGACTCTGTGCCCTACTCTACTGACCCCTGGCTAA  
AAATGATCATGATCACCCCACTTGCCTGCCCTCCCCCACGCCCTGACCGAGCCGAG  
GGGTGCCCACTGGAAGTCCGGCCAGAGGCCTAGAGAAATCTGGCCTAGCTGGCTC  
AGAGGAGCCCCGCCCTGAGAGCTAACCTGGCTAGGACCCCTGAAACCTCGAGGTTG  
GCAGAACGCTGAGGGCCTGCTGCCAGGCAGGGAGGGCACGGGAAGGAGGGAGGTGGGAT  
CGATGGCCTCCAAACAGGGAAACAAGGTGGCTGGTAGCTGGGACTCCACAAGACAGG  
TGTNTCTGGGAAGCTGAGCTTACAGCTGGATTCTGATTATTCAATTAAAGGG  
AGAGGCATTCCCCCTGGAGGGTACTGGCAGTGAATGCCCTGGAGTTGTGCTGTG  
CATAAACACTACTGTAGGAGGCAGCAACTCCTACCCACCTGCCATCACTCACCTTGC  
TTACTTCTGTTGATTGCCAGAACGACCCAGAGCCTGCCATGATTGACCCCTGTAGGC  
CAAGCCAAACAAACCCCGAATTGTCAGAATTTCGCCCTGGTATCCCCAAAGCCC  
AGCCCTGTCTTNAGGGTTTTCTATTGAGATTTCCTCATCCCACCCACCTTACT  
AATAAAGCCTCCTCAAACATAATTCTCCCCACCGCTCCACCCACCTTACT  
CCCAGTGGTTGGGTGCTGAGGAATATTTCACCCACCCACCCATCCAGCCCTGCC  
CAGAGGCCTGACTTGCATGCCCTGGTAGGNTTCAAGGGTACATTAGGGAGCAAAG  
CAGGGTGCAGGGCAAAAGGGACCCCTCCAAATGGTCGTGGCCCTTAAAAAAGCTG  
GGCAGGGNTTTTTTTTTTTTTTTTTTTTTTTTTTTGCGTATGACTATA

FIG. 4B (2)

TTAGGGTACACGAAACTGCTATCGCTCTGTATCGAGGCCCTGGCCAATGGCAGGC  
TGAGTCCCCCTCCTCTGGCCTGGTCCCCTCTCCTGCCCTTGTGCTCAGCGCTACCTG  
CTGCCCGGACACATCCAGAGCTGGCCACGGGTGCGCGGGGGGGGGGACCATGCAG  
GGAAGCTGCCAGGGCCGTGGCAGCGCCGCTTCTGCCGCCACCTGGCGTGTGAGAC  
TGGCGCTGCCACCATGTTCCCCAGCCCTGCTCTCACGCCACGCCCTCTCAGTCAAAGA  
CATCCTAAACCTGGAACAGCAGCAGCGCAGCCTGGCTGCCGCCGGAGAGCTCTGCCG  
CCTGGAGGCACCCCTGGGCCCTCCTCCTGCATGCTGGCCCTTCAAGCCAGAGGCC  
CGCTGGGCCGAGGCAGGCGCTGCGCCGGCCTCCCAGAGCTGCGCGAGAGCTGGCCG  
GCCCTCACCGCCAAGTGTGCGTCTGCCCTTCCGCCGCCCTCTATCCACGTGC  
CTACAGCAGCCCCGACCCAGCCAAGGACCTAGAGCCAAAAGAAAGGTGAGGAGGAAAC  
ACAGGCCCTCTCCCTGGGTGCTTCTGCCCAAGAAACTCAGGCCAGGAGG  
AGGACACACGGCCCTGGGCCAGGGCTGGCTGCGGCCGGGGTCAAGAATGTAAGAT  
GCCTGGTGTGCGCAGGCTCCCGCCGGCGTCCAATCGGAGGTTCAAGAGGAAATGC  
CGGATTGAAAGGATCCGAAAGCAAGAGACCAAAAAACTTTCCCCCGGCCTAACAAACC  
CCCGCGGTTCCGCTCTGCTCTGGTTCTGGTAGAATTAAAAATCGGTTATGGTTA  
AACAAAACAAAAACAGCAAACCCCCGTTTTTACCCCCCTGGATTTCAAACC  
CTTTTAAATTTGAAAAAAACCCCCAAACAAAATTAAATTTTCCCCAAAAAAT  
TTTTTTTTAACAAAAGGGGGGTGGAAAATTTTTCCCCCCCCAAAGGGGTT  
TTTGTTTTTTTT-----TTTNTTGGCAAAATGAATTNTGGANCAGGCCTTAT  
TTNAATGGATATTGGGNCCNCAGGATTGATTTGATTCATTATTTTAAGCAAATTNC  
CGGGCCGGCAAGGGAAAGGTTCCCTCGTGGAAAAGTAGGAAATGCTGCGTACCGCGGG  
CACAGGNAGTGGACGAGATGAGTGCAGGATCATCCCGCAGGCCATCCAGGATCGGG  
GGGAGGCCGGCCCGCTGCAGAAAGGGCTCTGGAGACCCCCCAGGCCAAGGCAGGAG  
CCCGGGCGATTCCGGAGGCCAGGGCGCTGGCAAGCGCTGGCGAAGGGCGCTGC  
CAGCCGGAGAGAATTCATAGGTTGAGGAGCAGAGGCTGGAAACAAATTGGCG  
GGCACGGCGCTAGAACTGATCGCTACCAATTGAGGAAGCCAGCAAGGCAGGTTCCGAG  
GCCGCTGCCACCCGAGCTTCTGGACACTGCGCAAACCTGCTGCGGCCAGGCTGG  
GCCTCGATACCAACACTCCCTGGCTTCTGTTGATTCTTAATTGAG  
ATAAGACCGTCCCTAGCAGTGAGGCCCTGGCCTCTGTTCAATTAACTTCTAACCAAC  
TAGCCCTAATTCAAGTTACCCCCAGAGCATTACCTGGTTTATTAAATTTTTATT  
TTATTATTTTTTTGAGCCTGAAATTAAAGTCACCGTTGTCTCCCTCACC  
AGGGTGTGAACGCCCGAGGGCAGAGACCTCCGTTTGTGTTCCAGCGCCTTGAGCCA  
GCTTGACTTTACAAATGCTGAGTGAGACGTGTCGGTGGCTCCAGTGCACTGGCAGA  
GTGAGCCGCAGCCAGCTGGCGCTCCAGGCAGGACACAGTGGCCTCACGAGGATCCCT  
ACCATTACTGTGCGGCCCGCTCGTAGGTCAAGCCGCTTACCAAGCGTCTTCTGCC  
TTCTGTTCCCCCTCAGAGCTGCGCGCTGCAGAAGCGGTGGAGCTGGAGAACAGA  
GGCGGACAACGGAGCGGCCGGCGACGGCGAGGAAGCCGCGTGTCTTCTC  
GCAGGGCAGGTCTATGAGCTGGAGCGGCCCTCAAGCAGCAGCGGTACCTGCGGCC  
CGAACCGCAGCTGGCCAGCGTGTGAAACTCACGTCCACGCAGGTCAAGATCTGGTT  
CCAGAACCGCGCTACAAGTGCAAGCGGAGCGGAGGACAGACTCTGGAGCTGGTGG  
GCTGCCCGGCCGCCGCTGCCAGGATCGCGGTGCCAGTGCTGGTGCAG  
TGGCAAGCCATGCCTAGGGACTCGGCGCCCTACCGCGCTGCCTACGGCGTGGCCTCAA  
TCCCTACGGTTATAACGCCCTACCCCGCTATCCGGGTTACGGCGGCCGCGCCTGCAGCCC  
TGGCTACAGCTGCACTGCCGCTTACCCCGCCGGCTTCCCCAGCCAGCCGGCACTGC  
CGCCGCCAACAAACTCGTGAACCTCGGCGTGGGACTTGAATCGGTTCAAGAGCCC

## FIG. 4B (3)

CGGGATTCCGCAGAGCAACTCGGGAGTGTCCACGCTGCATGGTATCCGAGCCTGGTAGGG  
AAGGGACCCGCGTGGCGCGACCCGTGACCGATCCCACCTCAACAGCTCCCTGACTCTCGTG  
GGGAGAAGGGCTCCAACATGACCTGAGTCCCTGGATTTCGATTCACTCCTGCAGGA  
GACCTAGGAACCTTTCTGTCCCACGCGCGTTGTTCTTGCACGGGAGAGAGTTGTGGC  
GGCGATTATGCAGCGTGCATGAGTGATCCTGCAGCCTGGTGTCTAGCTGTCCCCCAG  
GAGTGCCTCCGAGAGTCCATGGGCACCCCCGGTTGGAACTGGGACTGAGCTCGGGCACG  
CAGGGCCTGAGATCTGGCGCCATTCCGCGAGCCAGGGCCGGCGCCGGCCTTGCT  
ATCTCGCCGTGCCCCACGCACCCACCGTATTATGTTTACCTATTGCTGTAAG  
AAATGACGATCCCCTTCCCATTAAAGAGAGTGCCTGACCCGCACGTGTGCTTCTTCA  
GCTTGCCTCGCTTCAGAAGCAGGAGAGGGTGGCCCGGGACTGGTCTCAGATCTCAG  
GCACAGGCATTCCCTGAGCAAATTGATAACATTGATACTAATAAAACCTAACCTTGCTG  
GAACCATACTGGTCCGTGTCGGCACTTCTGAGATTGTCTCATATAATCCTCAATAAT  
CCAAAAAAAATCCTAAAGTTAGAAGCTGAGGGCCGGAGAGGTTAATGACTTAC  
CTGCGAGCAAATAGCCAGTACTAGTGAACCTCTGGTTAAATTAGGATGCCTCACTCAG  
AGACCGCCTCCCTGTGCTCCAAAGCTCCCTCTGAATCCTAATGTGTGCCAGGCACG  
GTTCCAGGCACTGGCATTAAATGGACAAGCAAAAGAACCTGGCCCTCTGTAGCTGGAG  
AGCACCGTGATCATCCACTAAAGAACCTCCTAACCTGTTCCAAGATGGNAAAAGCC  
AAGAANCCAAGCCCTGGNAAGCGTTCTCAAGGGTCTCANATGCCAAATGCCACG  
TCGGGGGCTCAACANCTNGCCGTTGGAACTGAATGCCNANGTGGCCCAAANAAGGN  
TCCTGCCTGGATGGNGCTCAACTCCAAGCTGTGGTGAAGGCCATAAAATTCAAATGGGCC  
AAGGGGAGCCCCCTAAAGCCCTAACCTTCNGGGGTCNTCCCTAACGGCATTAAANT  
TTACCAAAAGTTGGNCAAANAAATGTTCCAATGGNCCNGATTATNGANGGGNAAAAC  
TGGNGGGCAACCGAAATCCAGTTAAACCCGGTTGTT (SEQ ID NO.: 5)

## FIG. 5A

AGGCCCCCG CACCCCTCATC CTGGCTCCCG CCCCTTCTCT CCACCCCTCCC  
GGACCCCTAA AGGGCGGGCG GGGCCAAGC CGAGGGCGCT GCGCCTGACC  
CCGAGCGGAA GGGCCCCAGT CTAGGTCTA ATGCGGGTGG CGTCTCCTTT  
GACAGGCAGC GTTGGGGAC AACAGCGGGG ACGAGAGATA AGGTGACATA  
CCAGAGCAGA TTTGGTGCAG GCGCTGATAAC TCCTCTCCCG ACAGGAAACG  
CGGAGCTATT TAAAAGACCC TATCGATTAC TTTATCTTTC CTGGAAAGCT  
TCTTGCAGGAG AGACAAAAGA TGTTCCCTGC CTAAAGACAC AAGGCCACAC  
AACGGAGGGT CTGCACAGGC GACGC (SEQ ID NO.: 1)

TGCTCCTTT TAAGGGCTTG AATGTCTGCA ACTGTCTGT GTACACTTAA  
AG (SEQ ID NO.: 2)

## FIG. 5B

AGGCCCCCG CACCCCTCATC CTGGCTCCCG CCCCTTCTCT CCACCCCTCCC  
GGACCCCTAA AGGGGGCGGCG GGGCCCAAGC CGAGGGCGCT GCGCCTGACC  
CCGAGCGGAA GGGCCCCAGT CTAGGTCTTA ATGCGGGTGG CGTCTCCTTT  
GACAGGCGGC GTTTGGGGAC AACAGCGGGG ACGAGAGATA AGGTGACATA  
CCAGAGCAGA TTTGGTGCAC GCGCTGATAAC TCCTCTCCCG ACAGGAAACG  
CGGAGCTATT TAAAAGACCC TATCGATTAC TTTATCTTTC CTGGAAAGCT  
TCTTGCGGAG AGACAAAAGA TGTTCCCTGC CTAAAGACAC AAGGCCACAC  
AACGGAGGGT CTGCACAGGC GACGCACAAT TCGGGCGGG GAAAGCAAAA  
ACACACTGAC GCTTAGAGTG CACAAACGTG TGTGTTCCCA GAGCAGCTCC  
AGAGTGCAGC AGGGACGCTG GGGCGGGCGA GGGGCACCCA CAGTATGGTC  
TTCTGTGCCCT TTGGAAAGTT TTTTTTCACC GTATGCGCGT AAAACACGCA  
CACACAGAGA AAGTGAATGT GCACCTTAGGG CGCCTGTGTG TACCCGTGTC  
GTTTTAGCGA ATTTAAAGCA CATCAGGCCG GGCAGCCATGG CTCACGCCCTG  
TAATCCCAGC ACTTTAGGAG GCCGAGGCAG GCGGATCACC TGAGGTCAGG  
AGTCGACAC CAGCCTGGCC AACATGGTGA AACCTGTCT CTACAAAAAA  
TACAAAAATT AGCCGGGCAT GGTGATGCGT GCCTGTGATC CCAGCTACTC  
GGGAGGCTGA GGCAGGAGAA TCGCTTGAAC CCGGGAGGCG GAGGTTGCAG  
TGAGCCGAGA TCACACCACT GCACCTCCAGC CTGGGCGACA AGAGCGAAAT  
TCCGTCTAAA AAAATAAAAT AAAATAAAAT GATAATTAAG CCCATCAACT  
CACATTCAA GCGGTTACTG GTGGTTGTAA TGTATCCATA GACACAGGTC  
TAAAATGTAA ACGCTCCATT GTGCTCCTTT TAAGGGCTTG AATGTCTGCA  
ACTGTATGT GTACACTTAA AG (SEQ ID NO.: 3)

FIG. 5C

AGAGAAATCA TTACCCGATT CACAAAGAGC ATAGAGAGTG TAACAGTCAC  
TGATCTTGTGTT CAAATAGGGA GAGTTTTTT TCCTTCCCTT TTTGTAACAC  
CTGACCCACA GGACTGACAG TTCTAGGAAG CCCCCCTTACC CGAAAATAGG  
AAATAAAATCC TTGCCACCTT GATTTGCAAG GGCAATGCTA ATTTTTTTCT  
TTCTCCAGAG CTCTCAAAAA AAAAAAAA AAAACCTTAC TAAAAACAGG  
GATCCCGGAT GTAGCCTCGA TGTCCCCAT TAAACGGTAA TATTCAGGC  
GTCCGCTCAC ACTAATCTTT CAAACTGTCA TCGCGAGCCG CCTGGCCAGC  
AGATTCACTT AACAGCGCTC CCAGGACCCT CGTTCCGAGC TCTTTTCAGC  
GAGACATTGATT ATTGAATCGG ATGTGGCTCG TTTGCCAGAC GTCACCGCCT  
CGGCGATAGG CATCCTCTCC AACGACAC (SEQ ID NO.: 6)

FIG. 6 Transgenic Constructs of the Human *Csx/Nkx2-5* Enhancer

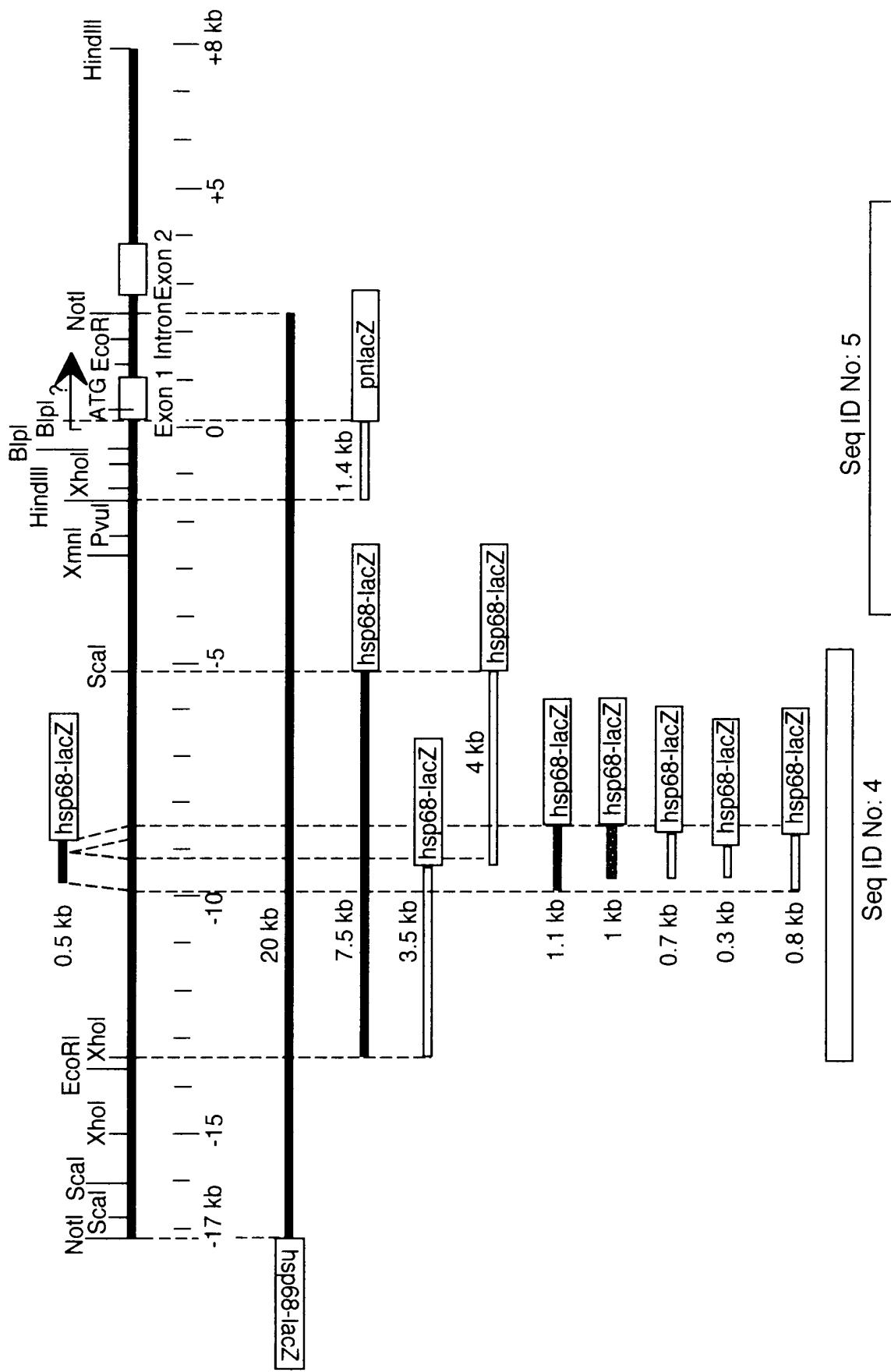
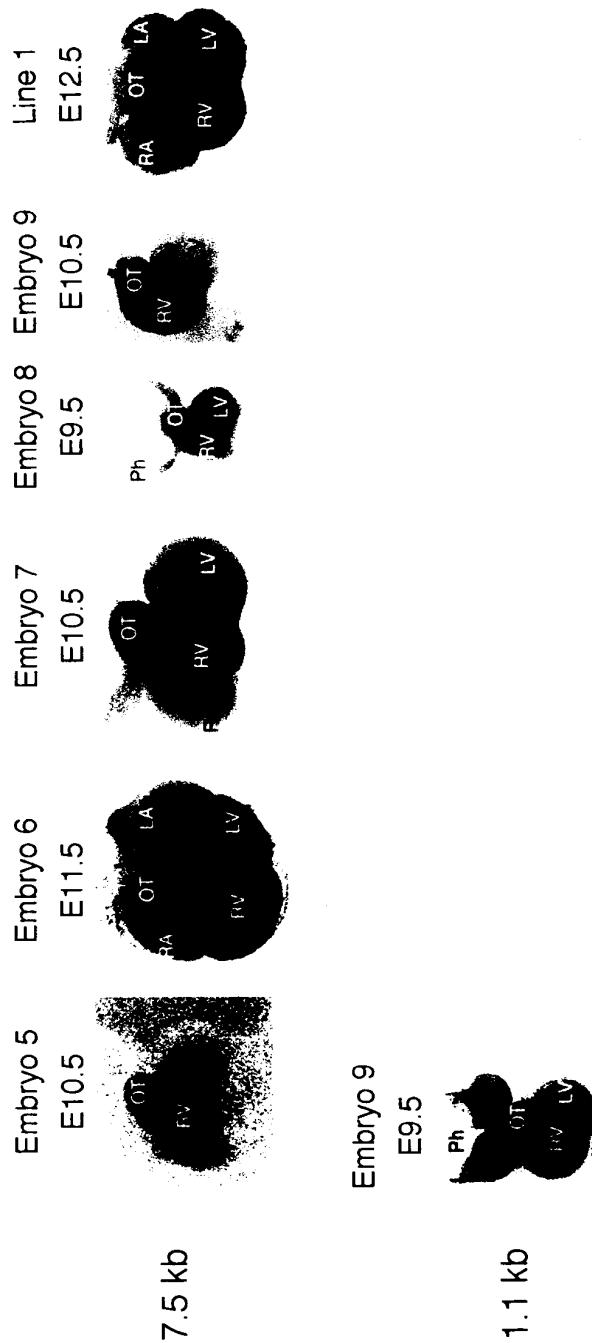


FIG. 7

**Transgenic Analysis of the Human Csx Enhancer Sequence**

Constructs	# of Transgenes	Enhancer positives (Cardiac : Ectopic) <sup>1</sup>
20 kb	8	4 : 0
7.5 kb	8	6 : 1
promoter-proximal 4 kb	7	0 : 1
promoter-distal 3.5 kb	6	0 : 0
1.1 kb	8	3 : 1
1.0 kb	10	1 : 2
0.7 kb	8	0 : 3
0.3 kb	11	0 : 6
0.8 kb	6	0 : 1
0.5 kb	2	2 : 0

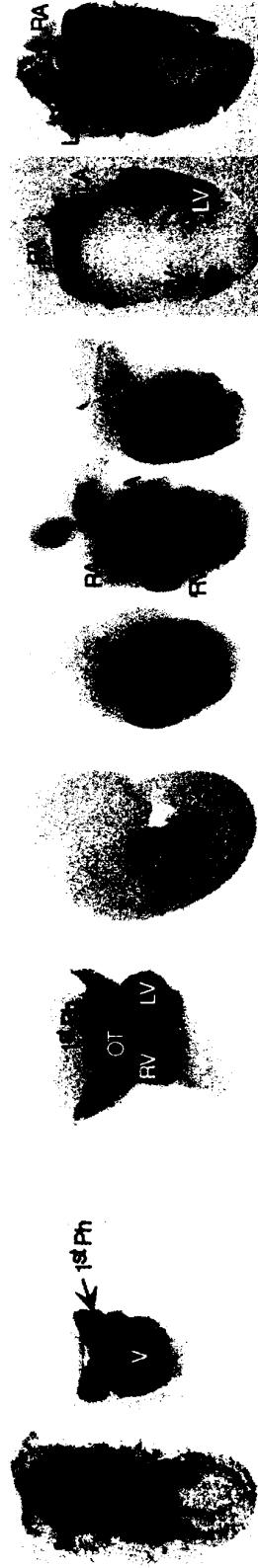
1. Each embryo was classified into either 'cardiac' or 'ectopic' judged upon the extent of similar to the endogenous Csx expression pattern.



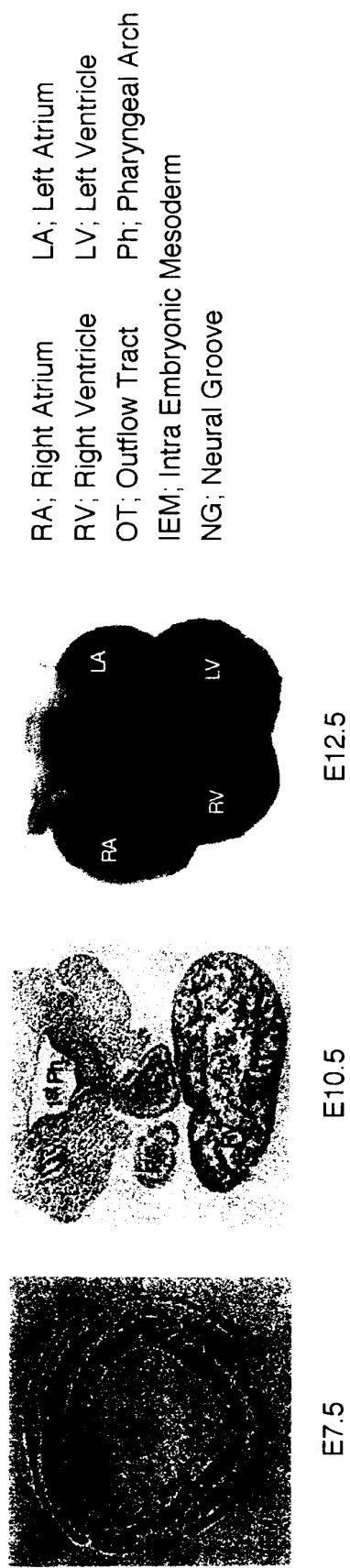
RA; Right Atrium      LA; Left Atrium      RV; Right Ventricle      LV; Left Ventricle  
 Ph; Pharyngeal Arch      St; Stomach      OT; Outflow Tract

Cardiac Expression of the 7.5 kb hCsx Enhancer-hsp68-lacZ Construct

100 CLASS



E7.5      E9.5      E10.5      E12.5      3 Days      4 Weeks



RA; Right Atrium      LA; Left Atrium  
RV; Right Ventricle      LV; Left Ventricle  
OT; Outflow Tract      Ph; Pharyngeal Arch  
IEM; Intra Embryonic Mesoderm  
NG; Neural Groove

FIG. 10

**Facilitated isolation of cardiac myocytes**

